

<b>Notice of Allowability</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/017,632	HESTER ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Hai Vo	1771	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to the filing of 03/03/2006.
2. ☒ The allowed claim(s) is/are 35-37,53 and 56-58.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☐ All    b) ☐ Some\*    c) ☐ None    of the:
  1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS ( as "replacement sheets") must be submitted.
  - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review ( PTO-948) attached
    - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
  - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

- |   |  |
|---|--|
| 1. <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 5. <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)                              |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 6. <input checked="" type="checkbox"/> Interview Summary (PTO-413),<br>Paper No./Mail Date <u>0512</u> . |
| 3. <input checked="" type="checkbox"/> Information Disclosure Statements (PTO-1449 or PTO/SB/08),<br>Paper No./Mail Date <u>0125 and 0304</u> | 7. <input checked="" type="checkbox"/> Examiner's Amendment/Comment                                      |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit<br>of Biological Material                                    | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance                     |
|   | 9. <input type="checkbox"/> Other _____.   |

***Terminal Disclaimer***

The terminal disclaimer filed on 03/03/2006 disclaiming the terminal portion of any patent granted on this application which would extend beyond the expiration date of US Patent No. 6,986,428 and US Patent Application No. 10/437,799 has been reviewed and is accepted. The terminal disclaimer has been recorded.

***Rejoinder***

Claims 35, 36, and 56-58 are directed to an allowable product. Pursuant to the procedures set forth in MPEP § 821.04(B), claims 37 and 53, directed to the process of making or using an allowable product, previously withdrawn from consideration as a result of a restriction requirement, are hereby rejoined and fully examined for patentability under 37 CFR 1.104.

Because all process claims previously withdrawn from consideration under 37 CFR 1.142 have been rejoined, the restriction requirement as set forth in the Office action mailed on 05/15/2003 is hereby withdrawn. In view of the withdrawal of the restriction requirement as to the rejoined inventions, applicant(s) are advised that if any claims including all the limitations of an allowable product claim or rejoined process claim are presented in a continuation or divisional application, such claims may be subject to provisional statutory and/or nonstatutory double patenting rejections over the claims of the instant application. Once the restriction requirement is withdrawn, the provisions of 35 U.S.C. 121 are no longer applicable. See *In re Ziegler*, 443 F.2d 1211, 1215, 170 USPQ 129, 131-32 (CCPA 1971). See also MPEP § 804.01.

**EXAMINER'S AMENDMENT**

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An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Douglas B. Little on 05/11/2006.

The application has been amended as follows:

***The claims:***

Rewrite claim 35: (currently amended) The layered sheet construction of claim ~~38~~ 56 which is wound into a helix having successive winds spaced apart to form a gap.

Rewrite claim 36: (currently amended) A layered sheet construction comprising:

- a. at least one gas permeable, water impermeable layer comprising a microporous layer coated with a gas permeable, polymeric coating;
- b. a gas delivery layer proximate the layer of part a, which gas delivery layer comprises a base having a side on which there are a plurality of walls forming a plurality of separate flow channels through which gas can be conveyed to the layer of part a, the ends of said walls opposite the base being attached to the microporous layer; and further comprising a microbial population proximate the layer of part a.

***Cancel*** claims 38, 39, and 44-53.

Rewrite claim 56: (Currently Amended) A layered sheet construction comprising:

- a. at least one gas permeable, water impermeable microporous membrane layer;

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- b. a gas delivery layer proximate the layer of part a, which gas delivery layer comprises a base having a side on which there are a plurality of walls forming a plurality of separate flow channels through which gas can be conveyed to the layer of part a, the ends of said walls opposite the base being attached to the microporous layer; and
- c. at least one microbial support layer located on the side of the gas permeable, water impermeable layer of part a opposite the gas delivery layer, said microbial support layer comprising a material suitable for the attachment and growth of a microbial population, and said microbial support layer being rendered hydrophilic, or having increased hydrophilicity, by a means selected from: i. being coated with a hydrophilic polymer; ii. having a hydrophilic polymer grafted to the microbial support layer; iii. incorporation of a surface active additive having a hydrophilic chemical group into the microbial support layer; and iv. a process comprising placing a microporous polymeric membrane in an ion sheath of a plasma containing a reactive species which reacts with the membrane surface and pore interiors.

Rewrite claim 57: (Currently Amended) A layered sheet construction comprising:

- a. at least one gas permeable, water impermeable microporous membrane layer;
- b. a gas delivery layer proximate the layer of part a, which gas delivery layer comprises a base having a side on which there are a plurality of walls forming a plurality of separate flow channels through which gas can be conveyed to the layer of part a, the ends of said walls opposite the base being attached to the microporous layer; and
- c. at least one microbial support layer located on the side of the gas permeable, water impermeable layer of part a opposite the gas delivery layer, said microbial support layer comprising a material suitable for the attachment and growth of a microbial population and said microbial support layer characterized by carrying a net positive surface charge.

***Reasons for Allowance***

The following is an examiner's statement of reasons for allowance: Note that Applicants' amendment is sufficient to overcome the 112 claim rejections. The obviousness-type double patenting rejections have been overcome in view of the terminal disclaimer filed on 03/03/2006. Applicants' amendment and Examiner's amendment are sufficient to overcome the art rejections and sufficient to place the instant claims in condition for allowance.

Of the references of record, the most pertinent are Insley et al (US 6,514,412), Degen et al (US 4,954,256) and JP 03-074047.

With regard to claim 36, Insley teaches a separation device comprising multiple layers of separation media 62, 72 and 74 and a structured layer 57 as shown in figure 4. Insley '412 teaches the layers of the separation media made from a microporous membrane (column 5, lines 52-55). Since Insley is related to a fluid separation device, one of skilled in the art would not have been motivated to place a mass of microorganisms proximate to the microporous membrane because to do so would destroy the objectives of Insley.

With regard to claims 56 and 57, Insley teaches a separation device comprising a selectively permeable fluid separation media 62, 72 and 74 and a structured layer 57 as shown in figure 4. Insley '412 teaches the layers of the separation media all are the same or all different or may have some the same and some different depending on what the requirements of the various separation media are (column 6, lines 5-10). Insley does not specifically disclose the microporous membrane being water impermeable and

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gas permeable. Degen, however, teaches a hydrophobic microporous membrane having been used widely in filtration of gases. Degen discloses the gas filter would be effective if the microporous membrane allows only gas to pass but will not allow drops of liquid such as steam condensate, pump oil droplets or other mists to penetrate and thereby block the pores of the filter (column 1, lines 20-35). Likewise, the hydrophobic membrane is gas permeable and water impermeable. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use the hydrophobic microporous membrane having the entire surface treated with a fluoropolymer coating for the separation media of the Insley invention motivated by the desire to avoid penetration of the pores by drops of liquid such as steam condensate, pump oil droplets or other mists with which the microporous membrane comes in contact during the filtration.

JP'047 teaches a battery comprising a three-layer structure oxygen selectively permeable membrane interposed between an air intake side of a gas diffusion electrode and an inner surface of a battery container to take oxygen into a battery at an adequate speed and to prevent penetration of water vapor and carbon dioxide. JP'047 discloses the three-layer structure oxygen selectively permeable membrane comprising a hydrophilic microporous film disposed between the two water repellent, gas permeable films. JP'047 is nonanalogous art and is not reasonably pertinent to the particular problem with which the applicant was concerned, i.e., the microbial support layer being rendered hydrophilic or having a net positive surface charge for the attachment and

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growth of a microbial population. Therefore, JP'047 is improperly combinable with Insley and Degen to achieve the claimed invention.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hai Vo whose telephone number is (571) 272-1485. The examiner can normally be reached on Monday through Thursday, from 9:00 to 6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Terrel Morris can be reached on (571) 272-1478. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

*Hai Vo*

**HAIVO  
PRIMARY EXAMINER**